IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Miller	Docket No.:	US 030082
Serial Number:	10/764,951	Examiner:	Kasztejna, Matthew John
Filing Date:	January 26, 2004	Art Unit:	3739
Title:	Apparatus and method for dissipating heat produeed by TEE probes		

Commissioner for Patents
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Appeal Brief

This Appeal Brief follows a final Office action mailed from the U.S. Patent and Trademark Office on February 6, 2007 and Applicants' Notice of Appeal submitted April 24, 2007.

Applicants believe that a fee in the amount of $500.00 is due under 37 C.F.R. §41.20(b)(2).

1. Real party in interest

Koninklijke Philips Electronics N.V. is the real party in interest in this case.

2. Related appeals and interferences

No prior or pending appeals, interferences, or judicial proceedings are known to Appellants, Appellants' legal representative, or Assignee which may directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal in the above-referenced case.

3. Status of claims

Claims 1-21 were rejected in the final Office action mailed February 6, 2007, which was maintained in the Advisory Action mailed April 13, 2007.

Claims 1-21 are pending, and are here appealed.

4. Status of amendments

No amendments to the claims were made in Appellants' Amendment and Response of April 4, 2007.

5. Summary of claimed subject matter

Claim 1 is directed to an endoscopic imaging apparatus. The apparatus includes an endoscope including a distal end [specification as filed p. 7 line 3 and FIG. 2]; at least one ultrasound transducer contained within the distal end [specification as filed p. 7 line 4 and Figs 2 and 4]; and an outer protective shell directly covering the distal end and fabricated from an electrically insulating material having a Thermal Conductance greater than 1 W/M-°K overlaying at least a portion of the distal end [specification as filed p. 4 lines 3-7, p. 4 Table 1, p. 7 lines 5-6, and FIGS. 2, 3, and 5].

Claim 9 is directed to an apparatus for dissipating thermal energy produced by an endoscopic imaging apparatus. The apparatus is configured and dimensioned to mate with a distal end of the imaging apparatus for dissipating thermal energy produced at the distal end [specification as filed p. 7 lines 22-24], the apparatus fabricated from an electrically insulating material having a Thermal Conductance greater than 1 W/M-°K and having an

outer protective shell directly covering the distal end [specification as filed p. 8 lines 1-2].

Claim 15 is directed to a method for scanning a patient's heart using a TEE probe. The method includes the steps of: providing an endoscope having a distal end having a portion thereof forming an outer protective shell directly covering the distal end fabricated from an electrically insulating material having a Thermal Conductance greater than 1 W/M-°K [specification as filed p. 4 lines 3-7, p. 4 Table 1, p. 8 lines 13-14, and FIGS. 2, 3, and 5]; and guiding the endoscope including a distal end to obtain a scan of the patient's heart [specification as filed p. 5 line 28 to p. 6 line 10, p. 8 line 15, and FIG. 6].

Claim 21 is directed to a device for passively dissipating thermal energy produced by at least one transducer located at a distal end of an endoscopic imaging apparatus. The device includes an outer protective shell directly covering the distal end and is configured and dimensioned to encase the at least one transducer [specification as filed p. 9 lines 4-5 and FIGS. 2, 3, and 5], the device having at least the following properties: electrically insulating; a Thermal Conductance greater than 1 W/M-°K; and substantially non-reactivity in the presence of bodily fluids [specification as filed p. 4 lines 3-7, p. 4 lines 29-32, p. 4 Table 1, and p. 9 lines 5-9].

6. Grounds of rejection to be reviewed on appeal

6.1 Rejection of claims 1-21 under 35 U.S.C. §102(e)

Independent claims 1, 9, 15, and 21 and dependent claims 2-8, 10-14, and 16-20 stand rejected under 35 U.S.C. §102(e) as being anticipated by Keast et al. (U.S. patent number 6,749,606, filed September 4, 2001 and issued June 15, 2004).

7. Argument

7.1 35 U.S.C. §102(e)

7.1.1 Introduction: history of prosecution

Claims 1-21 were initially rejected under 35 U.S.C. §103(a) in view of Tanaka et al. (U.S. patent number 5,827,175) in combination with Rabiner et al. (U.S. patent number

6,524,251) in an Office action mailed September 26, 2005. Applicants traversed rejection of claims 1-21 in an Amendment and Response submitted December 20, 2005.

Rejection of claims 1-21 was maintained under 35 U.S.C. §103(a) in view of Tanaka et al. (U.S. patent number 5,827,175) in combination with Rabiner et al. (U.S. patent number 6,524,251) in a final Office action mailed March 6, 2006. Applicants traversed rejection of claims 1-21 in an Amendment and Response dated May 5, 2006.

Amendment to claim 15 and Applicants' arguments were not entered in an Advisory Action mailed May 17, 2006. A Request for Continued Examination was submitted May 25, 2006 and amendment to claim 15 and Applicants' arguments were entered and acknowledged in a non-final Office action mailed August 24, 2006.

Rejection of claims 1-21 under 35 U.S.C. §103(a) in view of Tanaka et al. (U.S. patent number 5,827,175) in combination with Rabiner et al. (U.S. patent number 6,524,251) was withdrawn in an Office action mailed August 24, 2006. While previous Office actions and Amendment and Responses do not mention objections to the drawings, the Office action mailed August 24, 2006 accepted the drawings submitted January 26, 2004.

New rejection of claims 1-21 under 35 U.S.C. §102(b) in view of Yagami et al. (U.S. patent number 5,738,100) was imposed in the Office action mailed August 24, 2006. Applicants traversed rejection of claims 1-21 in an Amendment and Response submitted November 16, 2006.

Rejection of claims 1-21 under 35 U.S.C. §102(b) in view of Yagami et al. (U.S. patent number 5,738,100) was withdrawn in a final Office action mailed February 6, 2007.

New rejection of claims 1-21 under 35 U.S.C. §102(e) in view of Keast et al. (U.S. patent number 6,749,606) was imposed in the final Office action mailed February 6, 2007. Applicants traversed rejection of claims 1-21 in a Response submitted April 4, 2007.

Rejection of claims 1-21 was maintained under 35 U.S.C. §102(e) in view of Keast et al. (U.S. patent number 6,749,606) in an Advisory action mailed April 13, 2007. Applicants submitted a Notice of Appeal on April 24, 2007.

7.1.2 Characterization of cited prior art

The Office action of February 6, 2007 rejects claims 1-21 as anticipated by Keast. Keast is characterized below in Section 7.1.3.1.

The subject matter of the present independent claims is summarized in Section 5 above.

7.1.3 Claims 1-21

Appellants show below that claims 1-21 are not anticipated by Keast.

7.1.3.1 Keast et al. (U.S. patent number 6,749,606 filed September 4, 2001, issued June 15, 2004)

Claims 1-21 stand rejected under 35 U.S.C. §102(e) as anticipated by Keast.

Keast shows devices and methods for altering gaseous flow in a diseased lung (Keast, column 4, lines 10-11). The devices alter gaseous airflow within a lung to improve the expiration cycle of an individual having chronic obstructive pulmonary disease (COPD) (Ibid., Abstract). Keast shows selecting a site for collateral ventilation of the diseased lung and creating at least one collateral channel at the site (Ibid., column 4, lines 14-16). Keast shows devices for creating collateral ventilation within a lung (Ibid., FIGS 3A-3P), and devices for detecting blood vessels within lung tissue (Ibid., FIGS 5A-5D). The Office action mailed February 6, 2007 on p. 2 refers to the latter of these devices.

Keast's devices for detecting blood vessels have a flexible elongated member with a transducer assembly, a portion of which is located adjacent to a distal end of the elongated member (Ibid. column 15 lines 56-61 and FIGS 5A-5D). The transducer assembly generates a source signal and receives a reflected signal (Ibid. column 15 lines 65-67). The transducer assembly has transducers that allow for observance of Doppler effect (Ibid. column 16 lines 35-37).

One of Keast's devices has an ultrasound transducer and an acoustic lens that refracts and disperses a source signal over an outer surface of the lens (Ibid. column 16 lines 38-44 and FIG. 5A).

Another of Keast's devices has a hemispherical shaped ultrasound transducer affixed to the end of the outside of a flexible elongated member to determine the location of a blood vessel (Ibid. column 16 lines 62-67 and FIG. 5B).

Another of Keast's devices has a transducer assembly, a portion of which is located adjacent to a distal end of elongate member (Ibid. column 17 lines 1-4 and FIG. 5C). The transducer assembly has a flat ultrasound transducer and a cone acoustic mirror, which

reflects the signal over an area of 360° around the device (Ibid. column 17 lines 4-9 and FIG. 5C).

A variation of Keast's devices has a joint to articulate an end of the device, either to make sufficient contact with an area of tissue to be inspected for the presence of blood vessels, or to navigate within the body to access the area to be inspected (Ibid. column 17 lines 10-15 and FIG. 5D).

7.1.4 The present claims are not the same as the cited art

According to criteria established in the Manual of Patent Examining Procedure, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Manual of Patent Examining Procedure* § 2131 (8th ed., Rev. 4, Oct. 2005), *citing Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 U.S.P.Q. 2d 1051, 1053 (Fed. Cir. 1987). Thus, the standard for rejection under 35 U.S.C. § 102 is identity.

In contrast to Keast, claims 1, 9, and 21 are directed to an endoscopic imaging apparatus having an endoscope including a distal end; at least one ultrasound transducer contained within the distal end; and an outer protective shell directly covering the distal end and fabricated from an electrically insulating material having a Thermal Conductance greater than 1 W/M-°K overlaying at least a portion of the distal end.

Keast fails to show any endoscopic imaging apparatus that includes at least one ultrasound transducer contained within the distal end of the endoscope, to which claims 1, 9, and 21 are directed. In contrast to the subject matter of claims 1, 9, and 21, Keast merely shows devices having a flexible elongated member having a transducer assembly, a portion of which is located adjacent to a distal end of the elongated member (Ibid. column 15 lines 56-61 and FIGS 5A-5D). Keast states:

> FIG. 5A illustrates a variation of a device **600** adapted to determine the presence of blood vessels as previously mentioned. The device **600** includes a flexible elongate member **604** having a transducer assembly **606**. at least a portion of which is located adjacent to a distal end of the elongate member **604**. [Ibid., column 15, lines 56-61; emphases added]

Thus Keast does not show an endoscopic imaging apparatus with at least one ultrasound transducer contained within the distal end of the endoscope, to which Applicant's claims 1, 9, and 21 are directed.

Most important, Keast fails to show an endoscopic imaging apparatus including an outer protective shell directly covering the distal end, let alone an outer protective shell that is fabricated from an electrically insulating material having a Thermal Conductance greater than 1 W/M-°K overlaying at least a portion of the distal end, which is the subject matter of claims 1, 9, and 21.

Transesophageal Echocardiogram (TEE) probes used currently in medical examinations are susceptible to overheating. Specification as filed p. 1 line 26. TEE probes are often limited by the thermal rise of the probe surface from transducer self-heating during normal operation. Specification as filed p. 1 lines 27-28. It is common practice to avoid prolonged exposure of the patient to probe tip temperatures in excess of 43°C in order to minimize the risk of esophageal burns in adult patients. Specification as filed p. 1 line 31 to p. 2 line 1.

The endoscopic imaging apparatus that is the subject matter of claims 1, 9, and 21, includes an outer protective shell directly covering the distal end that is fabricated from an electrically insulating material having a Thermal Conductance greater than 1 W/M-°K, thus this apparatus provides a means for reducing the thermal rate of increase at the distal tip of a probe with the use of passive heat dissipation instead of active cooling methods. No active cooling methods are used because the probe tip is thermally conductive and passively dissipates heat.

In contrast to the subject matter of claims 1, 9, and 21, Keast's devices have a flexible elongated member with a transducer assembly, a portion of which is located adjacent to a distal end of the elongated member (Ibid. column 15 lines 56-61 and FIGS 5A-5D), which is not the same as the subject matter of claims 1, 9, and 21. The phrases "outer protective shell", "electrically insulating material", and "thermal conductance greater than 1 W/M-°K" are not even mentioned in Keast.

Further, nowhere does Keast show a method for scanning a patient's heart using a TEE probe that includes the steps of: providing an endoscope having a distal end having a portion thereof forming an outer protective shell directly covering the distal end fabricated

from an electrically insulating material having a Thermal Conductance greater than 1 W/M-°K; and guiding the endoscope including a distal end to obtain a scan of the patient's heart, which is the subject matter of claim 15.

In contrast to the subject matter of claim 15, Keast shows a method for avoiding intrapulmonary blood vessels while creating collateral channels in a lung (Ibid. column 4 lines 46-65), which is not the same as the subject matter of claim 15. In fact, the word "heart" is not even mentioned in Keast.

For these reasons, Keast is not the same as, and therefore fails to anticipate the subject matter of claims 1, 9, 15, and 21.

The final Office action mailed February 6, 2007 and the Advisory Action mailed April 13, 2007 allege that Keast, at column 15 line 56 to column 16 line 61 and FIGS. 5A-5D, shows the subject matter of claims 1, 9, and 21. Applicants respectfully traverse.

For convenience of the reader, the section of Keast cited in the Office action is:

> FIG. 5A illustrates a variation of a device **600** adapted to determine the presence of blood vessels as previously mentioned. The device **600** includes a flexible elongate member **604** having a transducer assembly **606**, at least a portion of which is located adjacent to a distal end of the elongate member **604**. Although the elongate member **604** is illustrated as having a lumen, the elongate member **604** may also be selected to be solid, or the elongate member **604** may have a support member (not shown) such as a braid to increase the strength and/or maneuverability of the device. The transducer assembly **606** is adapted to generate a source signal and receive a reflected signal. It may use a single transducer or multiple transducers. For example, at least a first transducer may be used to generate a signal and at least a second transducer may be used to receive the signal.
>
> The transducer or transducers may comprise a piezo-ceramic crystal. In the current invention, a single-crystal piezo (SCP) is preferred, but the invention does not exclude the use of other types of ferroelectric material such as poly-crystalline ceramic piezos, polymer piezos, or polymer composites. The substrate, typically made from piezoelectric single crystals (SCP) or ceramics such as PZT, PLZT, PMN, PMN-PT; also, the crystal may be a multi layer composite of a ceramic piezoelectric material. Piczoelectric polymers such as PVDF may also be used. The transducer or transducers used may be ceramic pieces coated with a conductive coating, such as gold. Other conductive coatings include sputtered metal, metals, or alloys, such as a member of the Platinum Group of the Periodic Table (Ru, Rh, Pd, Re, Os, Ir, and Pt) or gold. Titanium (Ti) is also especially suitable. For example, the transducer may be further coated with a biocompatible layer such as Parylene or Parylene C. The transducer is then bonded on the lens. A coupling such as a biocompatible

> epoxy may be used to bond the transducer to the lens. The transducer assembly **606** communicates with an analyzing device **602** adapted to recognize the reflected signal or measure the Doppler shift between the signals. As mentioned above, the source signal may be reflected by changes in density between tissue. In such a case, the reflected signal will have the same frequency as the transmitted signal. When the source signal is reflected from blood moving within the vessel, the reflected signal has a different frequency than that of the source signal. This Doppler effect permits determination of the presence or absence of a blood vessel within tissue. Although depicted as being external to the device **600**, it is contemplated that the analyzing device **602** may alternatively be incorporated into the device **600**. The transducer assembly of the invention is intended to include any transducer assembly that allows for the observation of Doppler effect, e.g., ultrasound, light, sound etc. The device **600** illustrated in FIG. 5A includes a transducer assembly **606** comprising an ultrasound transducer 608 and an acoustic lens **610** that is adapted to refract and disperse a source signal over an outer surface of the lens **610**. The lens **610** is designed such that it interferes and redirects the signals in a desired direction. The lens **610** may be comprised of materials such as dimethyl pentene (plastic-TPX), aluminum, carbon aerogel, polycarbonate (e.g., lexan), polystyrene, titanium, etc. It also may be desirable to place an epoxy between the lens **610** and the transducer **608**. Preferably, the epoxy is thin and applied without air gaps or pockets. Also, the density/hardness of the epoxy should provide for transmission of the signal while minimizing any effect or change to the source signal. The configuration of the transducer assembly **606** permits the lens **610** to disperse a signal over a substantial portion of the outer surface of the lens **610**. The lens **610** also is adapted to refract a reflected signal towards the transducer **608**. Accordingly, given the above described configuration, the device **600** of FIG. 5A will be able to detect vessels with any part of the lens **610** that contacts tissue (as illustrated by the line 612-612.) Although the lens **610** is illustrated as being hemispherical, as described below, the lens **610** may have other shapes as well. [Keast column 15 line 56 to column 16 line 16; emphasis added]

The device shown in FIG. 5A shows a flexible elongated member with an ultrasound transducer adjacent to the elongated member, and an acoustic lens that refracts and disperses a source signal over an outer surface of the lens (Ibid. column 16 lines 38-44 and FIG. 5A). The device shown in FIG. 5B shows a flexible elongated member with a hemispherical shaped ultrasound transducer affixed to the end of the flexible elongated member (Ibid. column 16 lines 62-67 and FIG. 5B). The device shown in FIG. 5C shows a flexible elongated member with a flat ultrasound transducer assembly located adjacent to a distal end of the elongated member, and a cone acoustic mirror that reflects the signal over an area of

360° around the device (Ibid. column 17 lines 1-9 and FIG. 5C). The device in FIG. 5D shows a flexible elongated member with an ultrasound transducer adjacent to the elongated member, and having a joint to articulate an end of the device (Ibid. column 17 lines 10-15 and FIG. 5D).

Factual analysis of the above paragraphs and of FIGS. 5A-5D of Keast demonstrates that these paragraphs in Keast fail to show any endoscopic imaging apparatus that includes at least one ultrasound transducer contained within the distal end of the endoscope, to which claims 1, 9, and 21 are directed. Rather, Keast shows in these paragraphs and figures that at least a portion of the transducer is located adjacent to a distal end of the elongated member, which is not the same as the subject matter of claims 1, 9, and 21.

Further, the above sections of Keast and FIGS. 5A-5D fail to show any endoscopic imaging apparatus including an outer protective shell directly covering the distal end, let alone an outer protective shell that is fabricated from an electrically insulating material having a Thermal Conductance greater than 1 W/M-°K overlaying at least a portion of the distal end, which is the subject matter of claims 1, 9, and 21. Factual analysis of these paragraphs from Keast show that the phrases "outer protective shell", "electrically insulating material", and "thermal conductance greater than 1 W/M-°K" are not even mentioned.

Therefore, these paragraphs and figures in Keast that were cited in the Office action mailed February 6, 2007 fail to show the subject matter of claims 1, 9, and 21.

The final Office action mailed February 6, 2007 alleges that Keast, column 6 lines 45-65 and column 15 lines 25-67 shows the subject matter of claim 15. Applicants respectfully traverse.

For convenience of the reader, column 6 lines 45-65 and column 15 lines 25-67 of Keast are shown below:

> The invention may include adding an agent to the lungs for improving the imaging. For example, a gas may be inserted into the lungs to provide contrast to identify hyperinflation of the lungs during an x-ray or other non-invasive imaging. For example, ^{133}Xe (Xenon 133) maybe used as the agent. Also, a contrast agent may help in identifying blood vessels during CT scans. Another example includes inserting a fluid in the lungs to couple an ultrasound sensor to the wall of an airway.
>
> The invention may also include providing a remotely detectable signal to indicate the presence or absence of any blood vessels at the target site. The

invention also includes methods and devices for marking a desired site for the creation of a collateral channel.

The invention also includes the act of creating one or more collateral channels within the respiratory system of the individual. The collateral channels may have a cross sectional area anywhere between 0.196 $mm.^2$ to 254 $mm.^2$. Any subset of narrower ranges is also contemplated. The collateral channels may also extend anywhere from immediately beyond the epithelial layer of the natural airway to 10 cm or more beyond the epithelial layer. The channel or channels should be created such that the total area of the channel(s) created is sufficient to adequately decompress a hyperinflated lung. The channel may be, for example, in the shape of a hole, slit, skive, or cut flap. The channel may be formed by the removal of any portion of the airway wall; e.g., a circumferential or arc-shaped ring of material may be removed to form the channel. Such an excised periphery may be for example, perpendicular or angled with respect to the axis of the airway.

Also, it is anticipated that along with any method of creating a collateral channel any loose material or waste generated by the creation of the collateral channel is optionally removed from the airway.

Another variation for creating the collateral channel is the creation of the airway using electric energy, for example radio frequency. [Keast column 6 lines 45-65] ...

The present invention includes the use of a device which is able to detect the presence or absence of a blood vessel by placing a front portion of the device in contact with tissue. One variation of the invention includes the use of Doppler ultrasound to detect the presence of blood vessels within tissue. It is known that sound waves at ultrasonic frequencies travel through tissue and reflect off of objects where density gradients exist. In which case the reflected signal and the transmitted signal will have the same frequency. Alternatively, in the case where the signal is reflected from the blood cells moving through a blood vessel, the reflected signal will have a shift in frequency from the transmitted signal. This shift is known as a Doppler shift. Furthermore, the frequency of the signals may be changed from ultrasonic to a frequency that is detectable within the range of human hearing.

The ultrasound Doppler operates at any frequency in the ultrasound range but preferably between 2 Mhz-30 Mhz. It is generally known that higher frequencies provide better resolution while lower frequencies offer better penetration of tissue. In the present invention, because location of blood vessels does not require actual imaging, there may be a balance obtained between the need for resolution and for penetration of tissue. Accordingly, an intermediate frequency may be used (e.g., around 8 Mhz). A variation of the invention may include inserting a fluid into the airway to provide a medium

> for the Doppler sensors to couple to the wall of the airway to detect blood vessels. In those cases where fluid is not inserted, the device may use mucus found within the airway to directly couple the sensor to the wall of the airway.
>
> FIG. 5A illustrates a variation of a device **600** adapted to determine the presence of blood vessels as previously mentioned. The device **600** includes a flexible elongate member **604** having a transducer assembly **606**, at least a portion of which is located adjacent to a distal end of the elongate member **604**. Although the elongate member **604** is illustrated as having a lumen, the elongate member **604** may also be selected to be solid, or the elongate member **604** may have a support member (not shown) such as a braid to increase the strength and/or maneuverability of the device. The transducer assembly **606** is adapted to generate a source signal and receive a reflected signal. [Keast column 15 lines 25-67]

Factual analyses of the above sections of Keast demonstrate that these sections of Keast fail to show the subject matter of claim 15. Nowhere do these sections of Keast show any method including any endoscope having a distal end having a portion thereof forming an outer protective shell directly covering the distal end, let alone an outer protective shell directly covering the distal end fabricated from an electrically insulating material having a Thermal Conductance greater than 1 W/M-ºK. Further, these sections of Keast fail to show a method including guiding the endoscope having a distal end to obtain a scan of the patient's heart.

Factual analysis demonstrates that the phrases, "outer protective shell directly covering the distal end", "electrically insulating material", "Thermal Conductance greater than 1 W/M-ºK", and "scan of the patient's heart" simply do not appear in these sections of Keast.

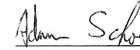
In contrast to the subject matter of claim 15, these sections of Keast merely show a device with a flexible elongated member having a transducer assembly, at least a portion of which is located adjacent to a distal end of the elongate member, and a method of using such a device to detect the presence or absence of a blood vessel in a lung, which is not the same as the subject matter of claim 15.

Therefore, these paragraphs in Keast that were cited in the Office action mailed February 6, 2007 fail to show the subject matter of claim 15.

For any of these reasons, Applicants assert that Keast is not the same as the subject matter of claims 1, 9, 15, and 21, and therefore these claims are not anticipated by Keast. Claims 2-8, 10-14, and 16-20 depend directly or indirectly from claims 1, 9, and 15 and incorporate all of the subject matter of these claims and contain additional subject matter. Therefore these claims also are not anticipated by Keast.

Therefore, Appellants assert that the present claims comply with 35 U.S.C. §102(e), and respectfully request that rejection of claims 1-21 under 35 U.S.C. §102(e) be withdrawn.

Respectfully submitted,



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8. Claims appendix

1. (previously presented) An endoscopic imaging apparatus comprising: an endoscope including a distal end; at least one ultrasound transducer contained within said distal end; and an outer protective shell directly covering said distal end and fabricated from an electrically insulating material having a Thermal Conductance greater than 1 W/M-°K overlaying at least a portion of said distal end.

2. (original) The endoscopic imaging apparatus as in claim 1, further comprising: controls for controlling the movement of the distal end; a signal processor for processing received signals from said at least one ultrasound transducer; and means for energizing the at least one ultrasonic transducer.

3. (original) The apparatus as in claim 1, wherein said covering is in thermal contact with the at least one ultrasound transducer.

4. (original) The apparatus as in claim 1, wherein said material is non-toxic.

5. (original) The apparatus as in claim 1, wherein said material is non-reactive in the presence of bodily fluids.

6. (original) The apparatus as in claim 1, wherein said material is selected from the group consisting of ceramic and diamond-coated copper.

7. (previously presented) The apparatus as in claim 1, wherein said material comprises an Alumina-based ceramic.

8. (original) The apparatus as in claim 1, wherein said material has a Thermal Conductance of approximately 30 W/M-° K.

9. (previously presented) An apparatus for dissipating thermal energy produced by an

endoscopic imaging apparatus, wherein the apparatus is configured and dimensioned to mate with a distal end of said imaging apparatus for dissipating thermal energy produced at said distal end, said apparatus fabricated from an electrically insulating material having a Thermal Conductance greater than 1 W/M-°K and comprising an outer protective shell directly covering said distal end.

10. (original) The apparatus as in claim 9, wherein said material is selected from the group consisting of ceramic and diamond-coated copper.

11. (previously presented) The apparatus as in claim 9, wherein said material comprises an Alumina-based ceramic.

12. (original) The apparatus as in claim 9, wherein said material is non-toxic when in contact with a patient's internal structures.

13. (original) The apparatus as in claim 9, wherein said material is non-reactive in the presence of bodily fluids.

14. (original) The apparatus as in claim 9, wherein said material has a Thermal Conductance of approximately 30 W/M-°K.

15. (previously presented) A method for scanning a patient's heart using a TEE probe comprising of the steps of: providing an endoscope having a distal end having a portion thereof forming an outer protective shell directly covering said distal end fabricated from an electrically insulating material having a Thermal Conductance greater than 1 W/M-°K; and guiding the endoscope including a distal end to obtain a scan of the patient's heart.

16. (original) The method as in claim 15, wherein said material is non-toxic.

17. (original) The method as in claim 15, wherein said material is non-reactive in the presence of bodily fluids.

18. (original) The method as in claim 15, wherein said material is selected from the group consisting of ceramic and diamond-coated Copper.

19. (previously presented) The method as in claim 15, wherein said material comprises an Alumina-based ceramic.

20. (original) The method as in claim 15, wherein said material has a Thermal Conductance of approximately 30 W/M-°K.

21. (previously presented) A device for passively dissipating thermal energy produced by at least one transducer located at a distal end of an endoscopic imaging apparatus, wherein said device comprises an outer protective shell directly covering said distal end and is configured and dimensioned to encase the at least one transducer, said device having at least the following properties: electrically insulating; a Thermal Conductance greater than 1 W/M-°K; and substantially non-reactivity in the presence of bodily fluids.

9. Evidence appendix

No evidence is submitted pursuant to 37 C.F.R. §§1.130, 1.131, or 1.132.

10. Related proceedings appendix

There are no proceedings related to this appeal.